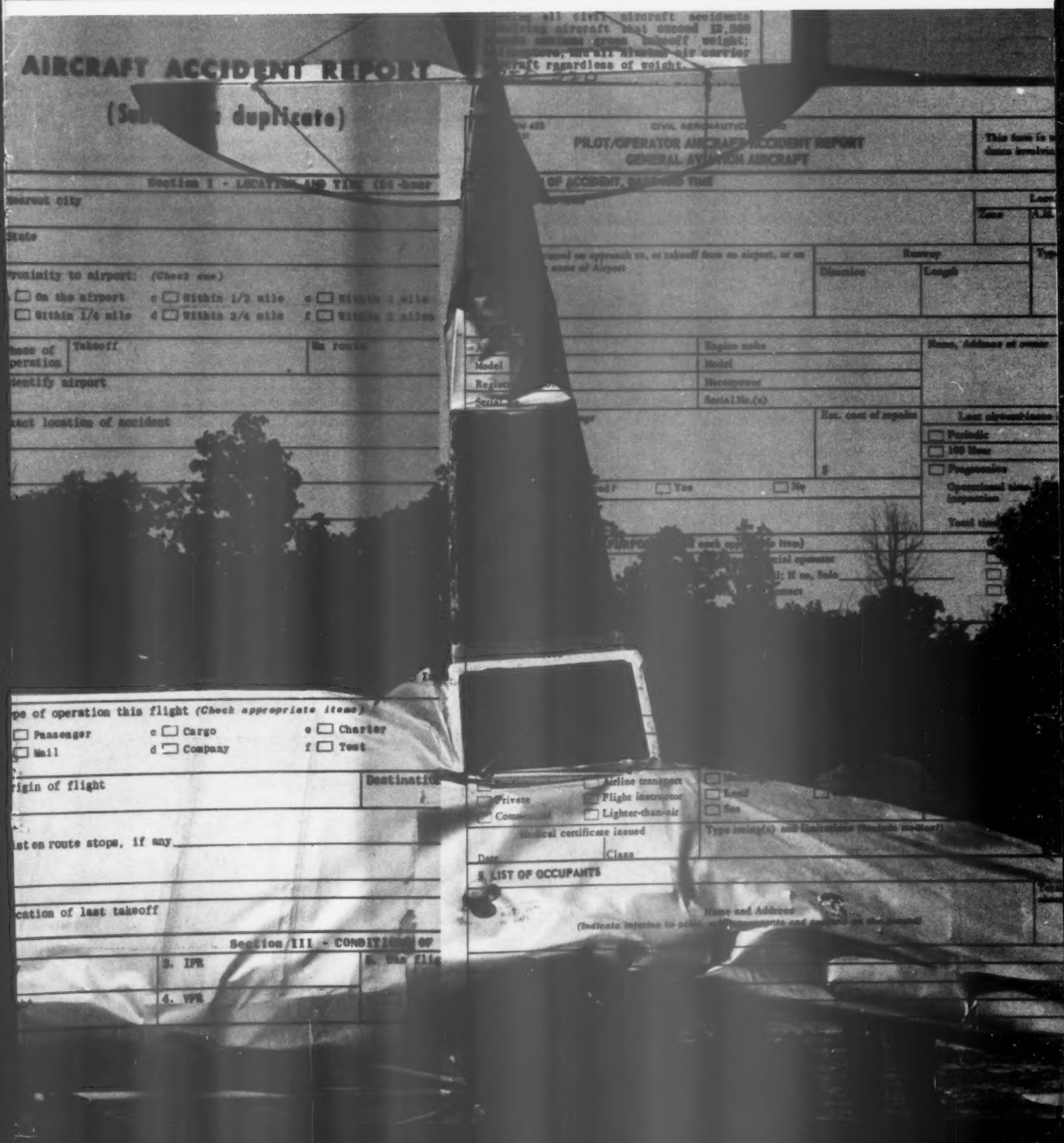
FAA AVIATION NEWS

MAY 1973



COVER:
Small details provide important clues for the accident investigator.
See page 4.

FAA AVIATION NEWS

DEPARTMENT OF TRANSPORTATION/FEDERAL AVIATION ADMINISTRATION VOL. 12, NO. 1

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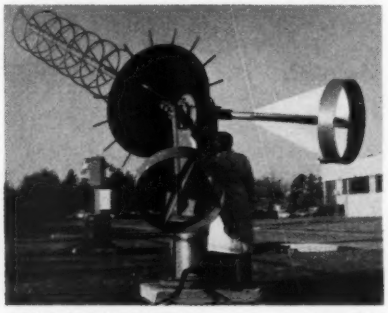

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Claude S. Brinegar, *Secretary of Transportation*
Alexander P. Butterfield, *Administrator, FAA*
Louis J. Churchville, *Asst. Administrator for Public Affairs*

David Gelfan, *Editor*
Gernot Rasmussen, *Art Director* Ruth Taksel, *Assistant Editor*

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Bird Bath

The question, how often should you wash your airplane, is about as difficult to answer as how often should you wash your hair. It all depends on the conditions. If you live and fly on a high plateau in Tibet, or on a desert in Arizona, the answer might be once a year—or two. If you are based in or near an industrial or coastal area, once a day might be a good idea. Although there is nothing wrong in washing an airplane for the sake of sprucing up its appearance, the more important reason is the prevention of corrosion.

Washing not only removes dirt and chemicals which favor corrosion, but it also enables you to see just how well your paint job is holding out. Paint is the outer skin of the airplane. Although no more than a few millimeters thick, it stands between your aircraft and the forces of nature which are constantly seeking to reduce it to its original organic state. Keeping the skin intact and the corrosion out is akin to keeping infection out of the human body.

All metals corrode, more or less rapidly, when exposed to corrosive elements. *Direct* or *chemical* corrosion, takes place when metal is exposed to a caustic liquid or gaseous agent. An example would be spillage of battery acid or undiluted cleaning agents on airplane metal. Less obvious chemical agents are found in the air near the seashore and wherever significant quantities of industrial pollution are present. In many areas of the country, where dampness and smog are prevalent, daily wipe-downs are recommended, and a thorough wash may be needed once a week. The dry climate in the inland states west of the Rockies has always been favorable to airplane longevity, but a growing presence of impurities in the air is now noticeable in that region, and indicates a need for protection against corrosion from atmospheric causes.

Galvanic corrosion is also a source of trouble to airplanes. This is brought about by the exchange of electrons taking place between two dissimilar metals. An obvious example would be the corrosion that occurs if copper fastenings were used on steel structures. Great care is taken to make certain that dissimilar metals are never in direct contact in airplanes. Indeed, even slightly different types of aluminum alloys are considered sufficiently dissimilar as to constitute a corrosion risk. Aluminum alloy rivets are color-coded and punch-coded to make certain that they are metallurgically compatible to the structures they support.

Nevertheless, it is a fact that an airplane contains steel, copper and brass, parts as well as aluminum alloys. When a pathway is created for electrons to travel from one such part to another, corrosion can take place. Water is capable of providing such a path once the protective outer coating of the metal (paint, cladding, etc.) is damaged. Hence the importance of frequent cleansing, which increases the durability of paint and also enables the airplane owner to observe weaknesses in the outer skin that would otherwise be obscured by dirt, oil, grease, etc.

Once the outer skin has been pierced, corrosion can travel extensively underneath. Many kinds of dirt, of course, contain metallic salts which can react directly with the metallic skin or structure of the airplane. The corrosive process may be slow, and largely invisible at the surface, but it could lead to an unsuspected inflight failure.

All rubber parts on the aircraft, including the tires, are very susceptible to deterioration from the various hydrocarbons that are always found around airplanes—especially fuel, oil, and hydraulic fluids. Natural rubber tends to break down more rapidly than synthetic rubber, but the lifespan of all rubber is extended by regular cleaning.

"A wash a day keeps corrosion away," is the motto of conscientious fixed base operators in smog affected areas. Manassas, Va. (above) is rapidly becoming a suburb of Washington, D.C.

The rubber, metal or fabric parts of an airplane respond very well to ordinary cold water and detergents (soap tends to leave a film). Use a brush that scrubs without scraping or tearing, and use plenty of clean water for rinsing.

Plastic windows need special care, since they are easily scratched. Regular window sprays and cleaners should never be used; gasoline, alcohol, benzine or acetone must also be avoided, as many plastics are solvent in them. If you cannot obtain *plastic window cleaner*, mild soap and water will do. If you use a cloth, take care that it is free of dirt or grit at all times, or you may find yourself peering through a maze of scratches in your windshield.

Incidentally, trying to dust off plastic windows with a dry dust cloth can be a totally frustrating experience. The friction tends to build up an electrostatic charge, which attracts even more dust—washing is the only way to go.

Airplanes unquestionally are hardy creatures, since they spend most of their lives exposed to all kinds of weather and usually seem little the worse for it, save for a gradual dulling of paint and bright parts. Just the same, a really thorough spring cleaning would literally be a lifesaver, if your scrub job happened to disclose a case of advanced corrosion. Pilots who really care will tell you that an airplane flies the way it feels, so why not keep it looking good? ■

Cleaning plastic windshields calls for dirt-free cloths or paper towels; the slightest hint of grit will cause scratches that obscure vision. Right—sealing material around windshield loses elasticity with age and exposure to weather, allows the cold and wind to whistle into the cockpit.

To the trained eye, the manner in which an aircraft part fails can point the way to the probable cause of the accident. Fragments are sent to the laboratory in Washington, D.C., for examination.

The Accident Sleuths

Shortly after ten o'clock on the evening of September 9, 1969, a small single-engine private plane was making what appeared to be a normal approach toward the Provo, Utah, airport. Suddenly, about a mile from the airport, it struck two 40 foot trees, then smashed into a 12,000 volt power line and crashed to the earth in flames. The pilot and his three passengers were all dead and still strapped in their seats when the rescue squad arrived at the burning plane minutes later.

The pilot was a 51 year-old physician from California. The day of the crash was the first wedding anniversary of his son, a student at Brigham Young University and that evening after dinner the doctor offered to take the young couple and a friend on "a short joy ride" to celebrate the occasion. The plane had taken off normally enough, and flew off in a long lazy circle out over the lake region. It was an apparently uneventful flight, and the pilot had expressed no difficulties when he requested permission to land. The tragedy occurred without a hint of trouble.

What went wrong? There were a few quick and easy answers that had to be checked out. The fatal crash had all the appearances of one of those unfortunate "flat-hatting" accidents when a pilot on a sightseeing flight simply flies too low and fails to watch out for tall trees and obstructions. And, of course, there could always be the suspicion that the pilot might have been imbibing too much—after all, it was an evening joy ride on a festive day. However, as is often the case, the easy answers were not the right ones, and the real cause was traced only after a lengthy and painstaking investigation.

The field office of the National Transportation Safety Board in Denver was quickly notified of the accident by FAA's Air Traffic Service, and it immediately sprang into action. The Safety Board field director, in phone contact with the Provo police, made sure that the accident area was properly roped off and that the plane was untouched. He also verified with the local medical examiner that autopsies would be performed on the accident victims. The following day, the Safety Board investigator—who from this point on would be known as the Investigator-in-Charge (IIC)—arrived at Provo. He was joined by an FAA investigator from the Utah General Aviation District Office—FAA investigators participate in all air crash investigations, and in non-fatal general aviation accidents they are usually delegated to do the investigation for the Board, which subsequently determines the cause. When the NTSB takes charge of an accident investigation, the FAA inspector at the scene is called the "Accident Coordinator"; at all other times he is the "Investigator-in-Charge".

The piecemeal work of investigation then began. Photographs of the accident site were taken by the two investigators; each part of the plane was carefully located and examined and tested if deemed necessary; and a chart was made of the exact location of various parts of the wreckage. Although the small plane had burst into flames, the fire had been quickly extinguished and most of the frame was still intact. Both propeller blades, however, had been separated from the propeller hub, and one of them was found 75 yards from the crash site.

Witnesses were located, and in a series of interviews they gave their recollections of the accident. The most knowledgeable testimony came from an experienced IFR-rated pilot who had been driving toward the airport in a car at the time of the crash. He had observed the doctor's plane in the sky above him as it was making its approach, but he stated that everything seemed perfectly normal.

The physician-pilot's background and flying history were also examined. He had an excellent reputation, and although he was only VFR-rated he had many years of accident-free flying experience. The weather at the time of the accident was checked: it had been a cloudless night, the wind a mild 6 knots at 180 degrees.

When the autopsy report was received, the toxological examination of the pilot revealed that there was no alcoholic content of any kind in his blood stream. The possibility of the imbibing pilot could now be dismissed.

Gradually the investigative picture began to emerge. An experienced, reputable pilot who had not been drinking was making a routine approach in good flying conditions. Could he have been careless in flat-hatting? The evidence to date did not seem to support it—the reflections of friends and colleagues argued against such behavior. The search for clues now focused on the airplane itself.

Slowly and carefully the investigators examined each section of the plane, power plant, structure, condition of cables, etc. Certain parts were packed in cardboard boxes to be shipped back to the NTSB laboratory in Washington for further scrutiny. One thing which particularly aroused suspicion was the distance the *propeller* had been thrown from the airplane. All parts of the propeller assembly were carefully collected for examination.

The metallurgical inspection in the laboratory in Washington eventually was significant. An examination of the microstructure of the threads of bolts used on the propeller governor and control yoke revealed that there was no evidence of "cold work"—that is, they had not been formed by rolling, as required by FAA approved specifications for bolts on that particular type of aircraft. Somewhere along the line someone had used improper bolts when working on the doctor's plane.

The Safety Board analyzed the findings of the total investigation, and determined that

the probable cause of the fatal accident was "propeller and accessories failure." At a crucial moment, apparently, propeller failure caused the airplane to lose altitude abruptly, and crash. Based on its investigation, the Board issued a Safety Recommendation to FAA urging preventive action. Shortly afterwards the agency issued an Airworthiness Directive "to prevent loss of propeller control" on that particular type of aircraft.

The AD instructed owners and operators to have an inspection by a mechanic within the next 25 flying hours. The propeller spline was to be removed and the equipment examined to make sure that the approved manufacturer's bolts were being used. The AD cited the proper bolt number, advised the owners to test for the evidence of cracks, and to repeat the examination by dye penetrant procedures every 100 flying hours.

The NTSB investigation at Provo, by demonstrating that the pilot was not guilty of carelessness, but rather that his airplane had failed him, possibly saved other pilots from suffering the same fate.

This type of general aviation accident is only one of the more than 4,000 for which the Safety Board finds probable cause each year. The National Transportation Safety Board, an independent agency within the Department of Transportation composed of five members appointed by the President and confirmed by the Senate. The Board also is empowered to determine cause and assume responsibility for marine, railroad, highway, and pipeline accident investigations and to make appropriate safety recommendations. However, about 80% of its total time is spent in the area of aviation accidents. Of the 275 employees in NTSB, 185 of them work in its Bureau of Aviation Safety.

NTSB has developed what it today considers the most sophisticated air investigative agency in the world. Its central office is located in Washington, but there is a field staff in 11 offices throughout the country. The central headquarters is staffed by highly qualified experts in various technical areas such as aerodynamics, metallurgy, meterology, aircraft systems, structures, powerplants, electronics, air carrier operations, aircraft maintenance, flight operations, air traffic control, and human factors. NTSB also operates a metallurgical laboratory, a readout and analysis laboratory for flight data recorders, and a third laboratory for the analysis of cockpit voice recorder data. Finally, its accident statistical staff utilizes automatic data processing for recording accident reports.

While the 1966 Act gave NTSB sole authority to determine the "probable cause" of all U.S. civil aircraft accidents, the law also stipulates that its findings and public reports may not be used in any legal proceedings. As one NTSB veteran says: "We're like the umpire—we may not be the most popular people in the aviation field, but we call them as we see them."

There are two principal types of air crash accident investigations conducted by NTSB: the "catastrophic accident," usually involving air carriers; and the smaller general aviation accident. To investigate the catastrophic accident, NTSB has a "go-team" which is composed of up to a dozen experts in various aspects of the investigative art. This team is on constant, 24-hour alert, and it is speeding on its way to the accident site as soon as possible after receiving notification of the accident.

The Board is usually alerted to accidents by FAA, either from towers or centers or flight service stations. But frequently accident reports arrive at NTSB in other ways. In air carrier accidents, the dispatchers are aware of the procedure and they often notify NTSB at once. And in the case of general aviation there are a variety of other ways in which notification sometimes arrives—from local police, from a witness, and even a number of times from the pilot himself who phones NTSB to say that he's just had an accident.

When the go-team arrives at the site of a catastrophic accident the various members operate under the direction of the Investigator-in-Charge, but each member works on his specialty—structure, systems, power plants, propellers, etc. Photographs are taken; the whole area is charted; and witnesses interviewed. This phase of the investigation may take from two to three weeks, and then all the reports and exhibits are taken back to Washington where further laboratory analysis may be called for.

In major air crashes, the Board frequently conducts a public hearing in which witnesses are called and sworn testimony taken. Finally, after all the evidence discovered at the accident site and disclosed at the hearing is analyzed, the Board issues its report stating the probable cause. This report is available to the public. The Board may also issue official safety recommendation to FAA, to the manufacturers of aircraft, and to other involved parties. To date, these NTSB recommendations, whether issued during the course of the investigation or at its conclusion, have been adopted in whole or in part in more than 90% of the cases.

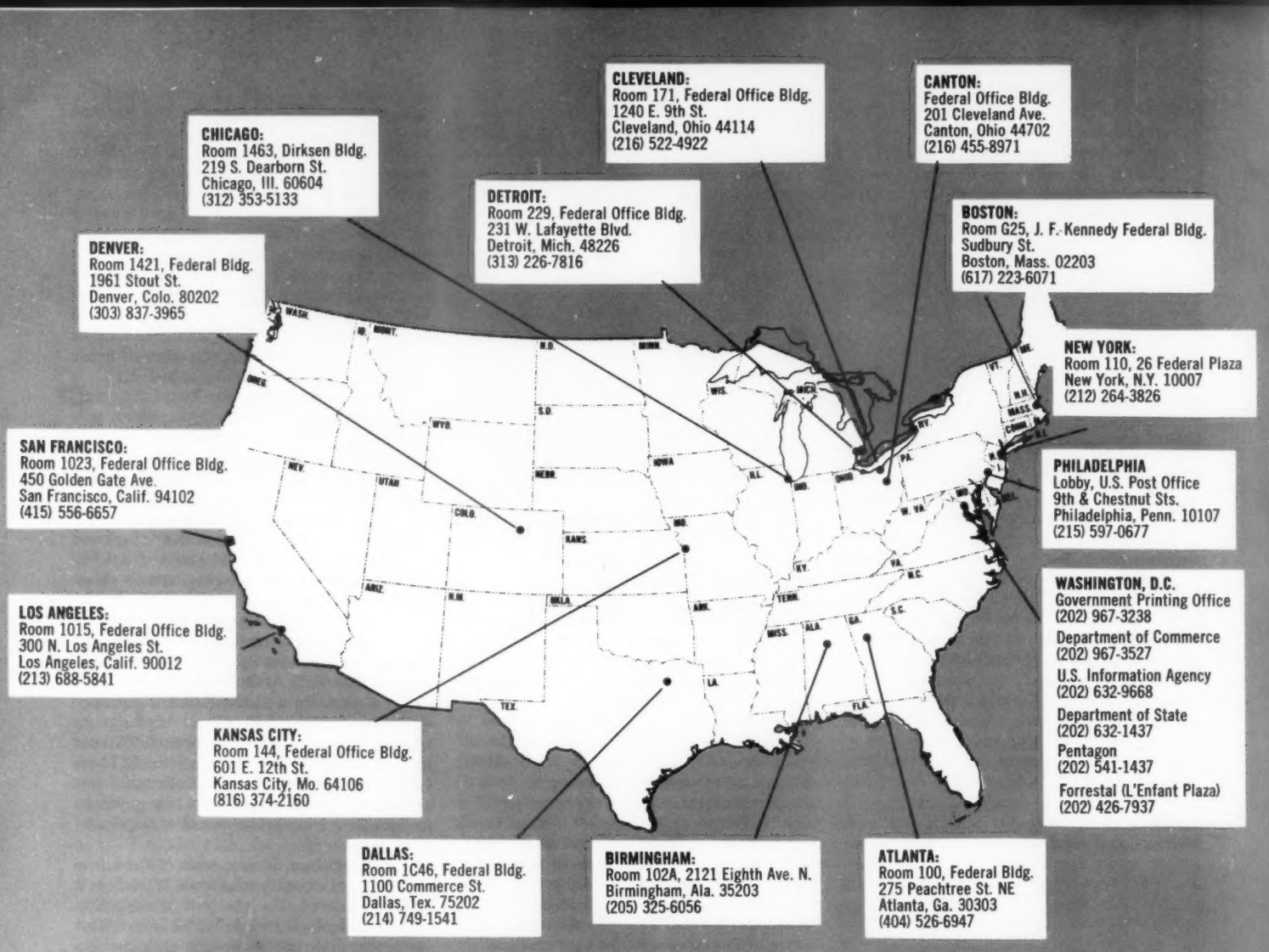
In cooperation with the Board, FAA conducts an investigation of all aircraft accidents, large or small, to assure fulfillment of the Administrator's responsibilities. These responsibilities may involve aircraft airworthiness, maintenance, procedures, registration, air traffic service, medical standards, etc.

The procedure is somewhat different in most general aviation accidents. If there is a fatality involved, the accident investigation usually is conducted by an NTSB investigator from the field office, but he may be accompanied by one or more experts from the Washington office if the situation warrants it. If there is no fatality, or if the accident involves restricted aircraft, such as agricultural aircraft, for example, an FAA investigator from the local office usually is delegated by NTSB to conduct the investigation.

FAA has its own network of over 3,000 investigators throughout the country, most of whom have been specially trained in accident investigation during a four-week course in Oklahoma City. FAA has unique responsibilities in the aviation community. It must approve the various makes of planes and it must certify pilots and supervise the various NAVAIDs and airport facilities. Thus, its investigating staff can determine whether there are any problems or deficiencies in these areas. FAA then in the course of its own investigation can issue airworthiness directives; and since it is the enforcer of regulations it can take any punitive measures which might be demanded. ■

(The second half of this article, in the next issue, will discuss the training of accident investigators.)

Left—an officer stands guard over damaged airplane while investigators look for dislodged parts that could help them piece together the story behind the crash. Souvenir-hunters or scavengers may interfere seriously with the investigation if not kept away. Plane is not moved from position of impact until all pertinent details are noted. Location of a single fragment may provide vital clue. Below—farm crop may be damaged by curious onlookers if guard is not posted.



INFORMATION, PLEASE

Pilots are also readers.

Usage of today's airspace requires not only the ability to pilot an airplane but also a current knowledge of aeronautics, air traffic procedures, rules of the road, ways of weather, etc. Authoritative reading material on aviation-oriented subjects are available at modest prices from the U.S. Government Printing Office in Washington, as many pilots know.

Along with aviation publications the Government Printing Office publishes some 24,000 other Federal publications, with a mail-order business volume that may run to as many as 60,000 orders a day. Obviously, processing such a volume of orders takes time, and pilots who order by mail must expect a lapse of four to eight weeks before the material will arrive.

For the convenience of those who need printed material on short notice, Government Printing Office bookstores have been established strategically in all sections of the country. A typical bookstore carries about 1,500 of the more popular publications in stock, and has access to others by special order. Bookstores will also have the current prices for all items—virtually all prices have been increased lately, and mailing a check to the Washington office for the wrong amount could result in additional delays in processing your order.

A sampling of best-sellers from the aviation shelves are listed below, along with their Advisory Circular (AC) numbers, which help to identify them. There are numerous other titles to chose from, as you can discover for yourself by planning your next cross country flight in the direction of your area GPO bookstore. Bookstore locations are plotted on the map above.

Pilot's Handbook of Aeronautical Knowledge (AC 61-23A) contains most of the basic, essential information needed to pass the written exam for the private pilot certificate. Price $4.

Instrument Flying Handbook (AC 61-27B) is designed to aid the pilot who has at least a private ticket and is working toward an instrument rating. Price $3.35.

Terrain Flying (AC 91-15) a pocket-sized booklet with advice for flying different types of terrain, much of the information compiled from veteran pilots of the individual areas. Tips on flying into Mexico, Canada and Alaska are included. Price 55 cents.

Pilot Transition Courses for Complex Single-Engine and Light Twin-Engine Airplanes (AC 61-9) this booklet provides training guidelines and checkout standards for pilots seeking to move from single-engine fixed gear airplanes to more sophisticated craft. Price 20 cents.

Guide to Drug Hazards in Aviation Medicine (AC 91.11-1) lists all commonly used drugs by pharmacological effect on airmen with side effects and recommendations. Price $.50.

Pilot's Weight and Balance Handbook (AC 91-23). This is an easy-to-understand explanation of fundamentals of aircraft weight and balance, and the reason for its importance. Price $1.25.

Airframe and Powerplant (A&P) Mechanics Handbooks, set of 3 volumes, can be purchased separately as follows: General Handbook (AC 65-9) Price $6; Powerplant Handbook (AC 65-12), Price $3.75; Airframe Handbook (AC 65-15) Price $4.

There are numerous other titles to choose from, and the bookstore locations are plotted on the map above. As a pilot you could kill two birds with one cross-country by making your next flight to one of these sites to see for yourself what GPO has in store for you.

PLEASE NOTE NEW PRICES BELOW. The revised Government Printing Office Price List for Federal Aviation Regulations shows numerous price changes which were not shown in the Status Sheet published in our March issue. New prices are shown in boldface below.

FAR's may be ordered, by volume only, from the Superintendent of Documents, Washington, D.C. 20402 or purchased from any Government Printing Office Bookstore. Prices include transmittals (amendments), which are sent automatically to subscribers.

FARs

STATUS of the FEDERAL AVIATION REGULATIONS

(As of May 1, 1973)

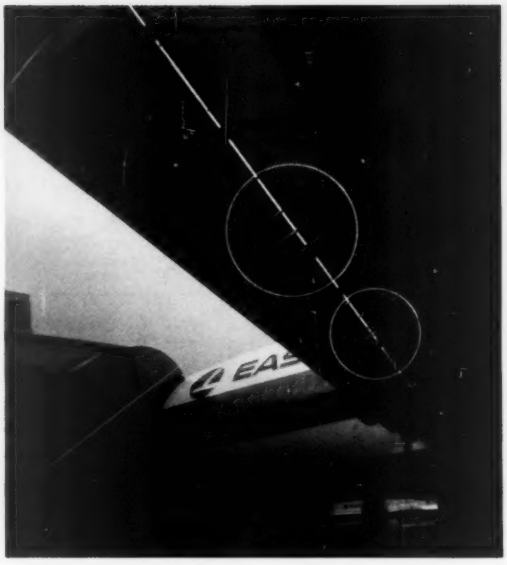
FAA VOLUME/PART	TITLE	PRICE
Vol. I: (Transmittals 1-5)		$2.50 + 75¢ foreign mailing
Part 1:	Definitions and Abbreviations (5)	
Vol. II: (Transmittals 1-28)		10.50 + $2.75 foreign mailing
Part 11	General Rule-making Procedures (25)	
Part 13	Enforcement Procedures (25)	
Part 15	Nondiscrimination in Federally Assisted Programs of the FAA (10)	
Part 21	Certification Procedures for Products and Parts (23)	
Part 37	Technical Standard Order Authorizations (28)	
**Part 39	Airworthiness Directives	
Part 45	Identification and Registration Marking	
Part 47	Aircraft Registration (27)	
Part 49	Recording of Aircraft Titles and Security Documents (27)	
Part 183	Representatives of the Administrator (1)	
Part 185	Testimony by Employees and Production of Records in Legal Proceedings and Service of Legal Process and Pleadings (2)	
Part 187	Fees	
Part 189	Use of Federal Aviation Administration Communications System	
Vol. III: (Transmittals 1-12)		$13.50 + $3.50 foreign mailing
Part 23	Airworthiness Standards: Normal, Utility and Acrobatic Category Airplanes (11)	
Part 25	Airworthiness Standards: Transport Category Airplanes (12)	
Part 36	Noise Standards: Aircraft Type Certification	
Vol. IV: (Transmittals 1-6)		$5.00 + $1.25 foreign mailing
Part 27	Airworthiness Standards: Normal Category Rotocraft (6)	
Part 29	Airworthiness Standards: Transport Category Rotocraft (5)	
Part 31	Airworthiness Standards: Manned Free Balloons	
Part 33	Airworthiness Standards: Aircraft Engines (2)	
Part 35	Airworthiness Standards: Propellers	
Vol. V: (Transmittals 1-12)		$3.50 + $1.00 foreign mailing
Part 43	Maintenance, Preventive Maintenance, Rebuilding and Alteration (12)	
Part 145	Repair Stations (8)	
Part 149	Parachute Lofts	
Vol. VI: (Transmittals 1-37)		$9.00 + $2.25 foreign mailing
Part 91	General Operating and Flight Rules (36)	
Part 93	Special Air Traffic Rules and Airport Traffic Patterns (37)	
Part 99	Security Control of Air Traffic (25)	
Part 101	Moored Balloons, Kites, Unmanned Rockets and Unmanned Free Balloons (8)	
Part 103	Transportation of Dangerous Articles and Magnetized Materials (34)	
Part 105	Parachute Jumping (19)	
Part 107	Airport Security (34)	
Vol. VII: (Transmittals 1-20)		$10.50 + $2.75 foreign mailing
Part 121	Certification and Operations: Air Carriers and Commercial Operators of Large Aircraft (20)	
Part 123	Certification and Operations: Air Travel Clubs Using Large Airplanes (8)	
Part 127	Certification and Operations of Scheduled Air Carriers with Helicopters (19)	
Part 129	Operations of Foreign Air Carriers	
Vol. VIII: (Transmittals 1-10)		$5.00 + $1.25 foreign mailing
Part 133	Rotorcraft External Load Operations	
Part 135	Air Taxi Operators and Commercial Operators of Small Aircraft (10)	
Part 137	Agricultural Aircraft Operations	
Vol. IX: (Transmittals 1-10)		$6.00 + $1.50 foreign mailing
Part 61	Certification: Pilots and Flight Instructors (10)	
Part 63	Certification: Flight Crewmembers Other Than Pilots (7)	
Part 65	Certification: Airmen Other Than Flight Crewmembers (9)	
Part 67	Medical Standards and Certification (6)	
Part 141	Pilot Schools (4)	
Part 143	Ground Instructors (2)	
Part 147	Mechanic Schools	
Vol. X: (Transmittals 1-8)		$7.00 + $1.75 foreign mailing
Part 139	Certification and Operations: Land Airport serving CAB-Certificated Scheduled Air Carriers Operating Large Aircraft (Other Than Helicopters)	
Part 151	Federal Aid to Airports (4)	
Part 152	Airport Aid Program (8)	
Part 153	Acquisition of U. S. Land for Public Airports	
Part 155	Release of Airport Property from Surplus Property Restrictions	
Part 159	National Capital Airports (6)	
Part 165	Wake Island Code (7)	
Part 167	Annette Island, Alaska, Airport (5)	
Vol. XI: (Transmittals 1-11)		$5.00 + $1.25 foreign mailing
*Part 71	Designation of Federal Airways, Area Low Routes, Controlled Airspace and Reporting Points (6)	
*Part 73	Special Use Airspace	
*Part 75	Establishment of Jet Routes and Area High Routes (4)	
Part 77	Objects Affecting Navigable Airspace (9)	
**Part 95	IFR Altitudes (6)	
**Part 97	Standard Instrument Approach Procedures (10)	
Part 157	Notice of Construction, Alteration, Activation and Deactivation of Airports (10)	
Part 169	Expenditure of Federal Funds for Nonmilitary Airports or Air Navigation Facilities Thereon (11)	
Part 171	Non-Federal Navigation Facilities (7)	

* Changes to individual airspace designations and airways descriptions, individual restricted areas and individual jet route descriptions are not included in the basic Parts 71, 73 and 75, respectively, because of their length and complexity. Such changes are published in the Federal Register and are included on appropriate aeronautical charts.

** Due to the complexity, length, and frequency of issuance, airworthiness directives, enroute IFR altitudes and standard instrument approach procedures are published in the Federal Register and are not included in basic Parts 39, 95 and 97. In addition, enroute IFR altitudes and instrument approach procedures are depicted on aeronautical charts.

Standard instrument approach procedures are published in the Federal Register by reference to FAA documents which are available for examination at the Rules Docket (AGC-24) and the National Flight Data Center, in FAA Headquarters, Washington, D. C. and at FAA Regional offices and Flight Inspection District Offices.

Rich's Fix



Slats, or leading-edge flaps, move down and forward, smoothing the flow of air over the wing-top during flight at slow speeds or nose-high attitudes, to help prevent stalls. Powerful hydraulic actuators which extend the slats are circled.

Chances are that very few of the passengers that fly on B-727 jets have ever heard of Burrus Y. (Bud) Rich, who is a mechanic in Eastern Airline's heavy maintenance shop in Miami. Nevertheless, the safety of those passengers has been enhanced because of Bud Rich's solution to a recurrent maintenance problem on the airplane—and his company has saved thousands of dollars in the process. For his efforts Rich has been named the national winner in the air carrier class of the FAA Tenth Annual Mechanic Award competition.

When one of the hydraulic systems on a jetliner fails in flight the crew gets suddenly very busy. All the things that are normally run by that particular system—many of them automatically—must be accomplished by some other means, many requiring individual attention. Some of the functions can be switched to another hydraulic system; some are performed manually; others the crew must simply get along without. For example, when landing the B-727 the lower rudder and the leading edge devices may be operated by a *stand-by* hydraulic system; but crosswind capability is limited and the landing must be made with no more than 30 degrees of flaps. The gear has to be extended manually.

A perfectly safe landing can be made under these non-standard conditions, but the situation has its inconveniences. The captain must declare an emergency, requesting that fire trucks stand by for his landing and roll-out. Sometimes he must be given priority for landing, which disrupts the normal flow of airport traffic and may require other planes to alter their flight path in the area.

Even after the plane is safely on the ground the story is not ended. There is nearly always a costly maintenance bill, because when the hydraulic system fails both of the engine-driven pumps of that system usually fail also. The pumps, and miscellaneous related parts, must be replaced, and if the system has been contaminated, as often happens, it must be flushed to remove all traces of metal.

Bud Rich had seen this kind of breakdown, at least once a month, when the hydraulic seal on the wing slat actuator had failed. As he worked to repair the airplane, he looked for ways of preventing its happening again so often.

Slats are movable devices on the leading edge of the wing. They provide a way to keep the airflow moving smoothly over the upper surface of the wing, decreasing the likelihood of stalls when flying with a nose-high attitude and/or a slow airspeed. They are activated hydraulically by means of arms, or actuators, which swivel on a trunnion, or pivot pin.

The machinery is held in place inside the front of the wing by a bracket which, under stress of use, is subject to flexing. This can create enough resistance to the actuator that the end cap seals are blown out and the hydraulic system fails.

On August 25, 1970, Bud wrote a letter to Robert F. Moore, Eastern's Vice President in charge of maintenance:

". . . I have observed the actual cause of the seal failure and know there is an engineering order to shim the actuator when it continues to fail. This is a temporary fix and will fail again as soon as the mount bracket begins to flex.

"I am sure that all actuators in all 727 a/c can be fixed by adding two long mount bolts, two spacers, two nuts and four washers, without modifying the actuator mount and while the actuator is still installed in the aircraft. I would discuss this with anyone interested."

Eastern was definitely interested. Mr. Moore wrote back:

"You are correct in stating that the B-727 slat actuator leaking problem has resulted in too many delays. We are of course extremely interested in your approach for fixing the mount brackets and associated tendency to flex . . ."

Rich's remedy was studied by the engineers and FAA, and approved and tested in the field. After two years of surveillance, the "fix" was found to virtually do away with slat actuator hydraulic failures in Eastern's 727. On May 17, 1972, an engineering order went out to all Eastern's service shops directing that all B-727s receive the Rich fix by July 1, 1974.

The company management estimates that the Rich's simple fix saves some $23,000 per airplane, and they are justifiably grateful. They are equally aware of the safety aspect of the situation, and are appreciative of the conscientious attitude of employees like Bud Rich, who are always looking for a better way to keep planes flying. They describe Bud as a "highly motivated, conscientious employee, a credit to his profession as an A & P mechanic."

Bud Rich was born in Central City, Kentucky in 1940, and later moved to Palm Beach, Fla., where he graduated from high school and junior college before entering the Navy as an airman recruit at the age of 17. He was trained as a mechanic at Pensacola and Quonset Point, and was then assigned to the Aircraft Carrier U.S.S. *Wasp*. He was discharged in February, 1961, and went to work for Pratt and Whitney Aircraft Corporation in West Palm Beach. He has been with Eastern since 1968. He lives in Miami with his wife and five-year-old son.

Rich finds an aircraft mechanic's life a good one, and would not hesitate to recommend it to his son. He himself had once though about becoming an engineer, but decided that "a good mechanic is better than a bad engineer." He believes that working with his hands at close range with aircraft gives you an invaluable insight into maintenance problems. His success with the slat actuator hydraulic problem would seem to prove his point.

Bud has a private pilot's license and flies whenever he has the opportunity. On June 24 he and his family will be flown here to Washington, D.C. to receive national recognition as the outstanding airline mechanic of 1972. His rewards on that occasion, in addition to the all-expense-paid trip to the capital, will include several cash awards from aviation organizations and industry, matched sets of tools and a tool-box, and the bronze plaque that proclaims him top air carrier mechanic of the year. ■

The 21 Air Carrier Regional winners of the 10th Annual FAA Aviation Mechanics Award

Alaska:

James T. Hutchison, Alaska International Air, Inc., Fairbanks, developed a method for relining the steering cylinders with steel for increased reliability; an improved system for heating the props; and a means of repairing cracks in the cowling by heli-arc welding for Lockheed 382 cargo aircraft.

Central:

Albert O. Rule, Kansas City, whose fellow workers call him the "fastest mechanic at TWA" has, in 30 years with the company, devised numerous tools and jigs for more efficient repair. His plaster cast method of transferring hole locations for precise drilling eliminates stress on the replacement part.

Eastern:

Jerome Beja, New York Airways, Flushing, N.Y. solved a recurrent problem of S61 helicopter rotor gear box cowlings loosening by replacing screws with drilled head bolts and link safety-all bolts, eliminating the danger of the boxes becoming detached.

Europe:

Sam Zolick, Pan American World Airways, New York, devised a more effective procedure for testing the localizer signals of the VOR/ILS in Boeing Aircraft while on the ground by relocating the test equipment to a position outside the plane during the test.

Great Lakes:

Joseph Nanista, Chicago Helicopter Airways designed a method for anticipating failure of the tail rotor drive-shaft bearings of the Bell Jet Ranger 206 helicopter through the use of a temperature - indicating tape installation on the bearing housings.

New England:

Peter J. Blouin, American Airlines, Boston, noted that the door to the life-raft ceiling compartment of an airliner could not open fully because of a conflict with the latch of another door, and designed a system of slotted doors which allows full opening of both.

Pacific:

Genji Ono, Aloha Airlines researched the frequent failure of the voice recorders in the Boeing 737, and discovered overheating to be the problem, which he solved by installing a "heat sink" to lower the temperatures. He also designed a wiper pad to eliminate dirty recorder tapes.

Western:

Harry A. Petros, United Airlines, San Francisco, modified a DC-8 flap cylinder assembly to eliminate cracking, thus increasing the life of the part to 2½ times of its former usability. He also developed a reinforcement for a landing gear actuator barrel with a hot-cold shrink-fit collar.

Southwest:

James W. Totter, American Airlines, Dallas, Tex. developed a method of using temperatures for checking the cells in NICAD batteries which are used for APU starts and for emergency power to essential flight instruments and lights when the normal power system fails.

Rocky Mountain:

A Frontier Airlines maintenance team from Denver researched recurrent failure of the mach trim coupler on Boeing 737s, and determined the cause was excessive heat. They designed a system of test panels, after which the reliability of the part increased from 1517 hours in 1971, to 3537 in 1972. 1st row: C. Yoder, S. Cuellar, C. Anderson; 2nd row: C. Carter, A. Loller, E. Willard, D. Recknor, Q. Bryan; 3rd row: M. Doudy, K. Johnson, F. Gilbert.

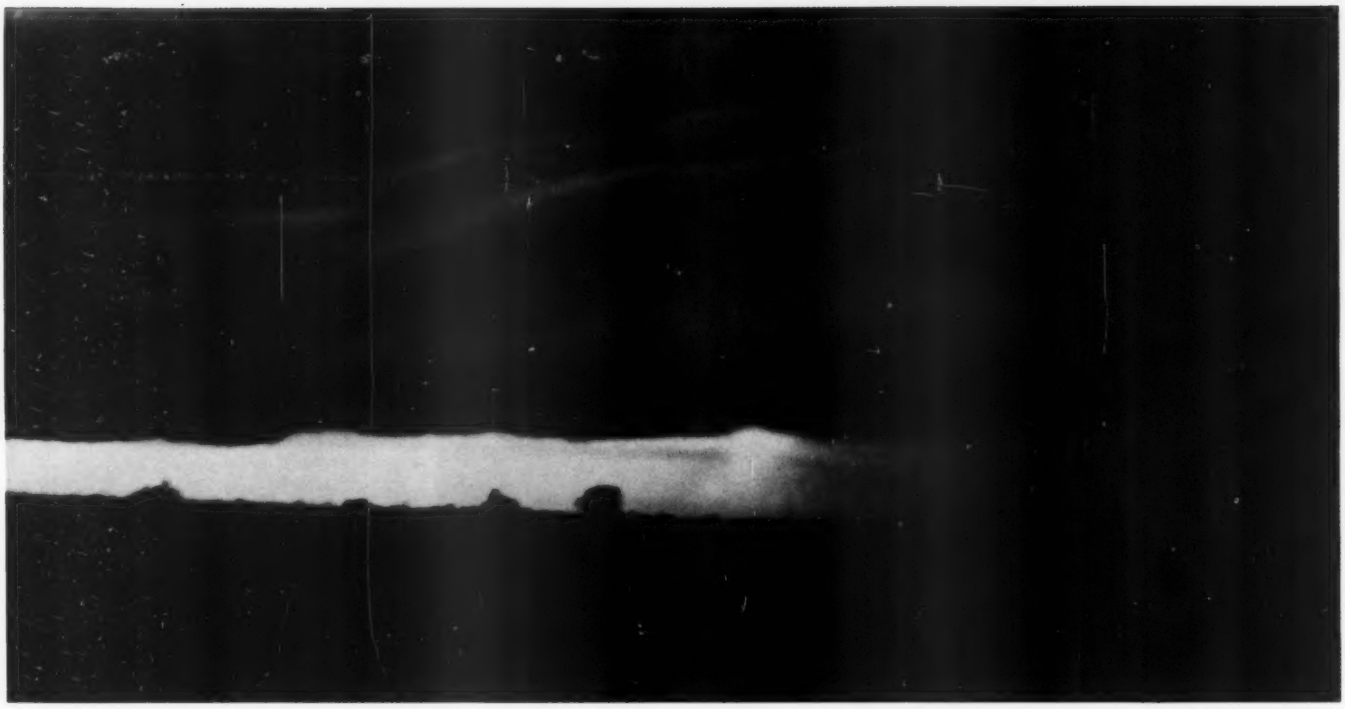
Northwest:

Donald "Swede" Summers, Spokane International Airport, was honored for his overall professionalism over a period of ten years in maintaining half a dozen of today's more complex aircraft and in keeping the fleet's NICAD batteries trouble-free.

GA winners featured next month.

The next issue will feature the general aviation national and regional award winners in this annual program spotlighting the contributions of maintenance men to aviation. The national winner in general aviation is Charles A. Macha, right, of San Antonio, Texas. Mr. Macha is a Designated Mechanic Examiner. Both national winners will be honored in a ceremony in Washington, D.C. on June 24.

Charles A. Macha



This is the second article in a series prepared by meteorologists of the Weather Service for FAA.

Cold Fronts

Breeders of nearly any kind of weather you can imagine

Mention of the word "front" and some pilots are already mentally "on instruments" in the mistaken belief that it implies nothing but bad flying weather. Actually, some fronts bring little or no weather of any importance. And, of course, bad weather can occur where no front exists.

Another common misconception pictures fronts as sharp walls of weather. Only rarely does a front present a well-defined surface on the ground or in the air. Perhaps this false picture arises from the use of lines to indicate fronts on the weather map. Each of these lines shows the surface location of a front as determined from observations of windshift, pressure change, temperature change, and other factors. But frontal weather may occur over an area that is 5 to 50 miles or more wide. In flight, *the weather associated with a front may be encountered well ahead of or behind the line on the surface map.*

A front is a transition or buffer zone between two large air masses with different properties of moisture or temperature. A single air mass may spread over several hundred thousand square miles. Everywhere along its boundary, there is a front if the temperature or moisture of the air mass differs significantly from those of the adjacent air mass. Thus, while fronts may rise only a mile or two vertically and may be from 5 to 50 miles wide, they usually extend for hundreds of miles in length.

When two air masses meet, natural forces try to neutralize the differences between them. The denser, heavier cold air seeks the lowest levels, and the temperature attempts to mix evenly. In the process, clouds, precipitation, turbulence, icing, and windshifts may be produced. Not all of these conditions occur with every front. In some cases, all of them are present, sometimes only a few, and occasionally none. Furthermore, one set of conditions may be reported at the surface, while something quite different is encountered by the pilot in flight.

Meeting of Air Masses

When a mass of heavy, cold air comes in contact with a mass of light, warm air, the cold air forces its way under the warm air. As the warm air is pushed upward, it expands and cools. Clouds and precipitation are likely to result. If the warm air is unstable, cumulus clouds and showers will usually form when it is forced to rise. This occurs because the condensation of moisture adds heat to the rising air columns, making the columns warmer and more buoyant than their surroundings and enabling them to rise freely to great heights. Turbulence will be found in such clouds. On the other hand, if the warm air is stable it will form stratus clouds with steady precipitation and little turbulence.

Some fronts do not produce clouds and precipitation because the warm air is very dry or because it is not lifted enough to cause condensation to occur.

Heavy cold air forms a wedge under

light warm air. The angle of this wedge is called the slope. Gently sloping frontal surfaces tend to bring extensive cloudiness and large areas of precipitation. These gentle slopes occur when the difference in temperature and wind velocity between the air masses is small.

Steep frontal surfaces usually produce narrow bands of cloudy weather with precipitation localized along the immediate front. Ordinarily, fronts have steep slopes when the difference in temperature and wind velocity between the two air masses is large.

Visualizing the slopes of frontal surfaces can be of great assistance to the pilot. Consider, for example, a front with a slope of 1 in 50 (which is average for cold fronts) that intersects the surface along a north-south line through Chicago, with the wedge of colder air to the west. A pilot flying 50 miles west of Chicago could expect to find the frontal surface one mile above the ground. Aircraft 100 miles west could encounter the front at about 10,000 feet.

In the United States, weather systems and storm fronts generally move from west to east. Their movement follows the large-scale wind pattern in our hemisphere. This does not mean that the entire motion of weather is always directly from west to east. But the pilot planning his flight can be fairly certain that the moving pressure centers and fronts on today's weather map will be found farther to the east tomorrow and the next day.

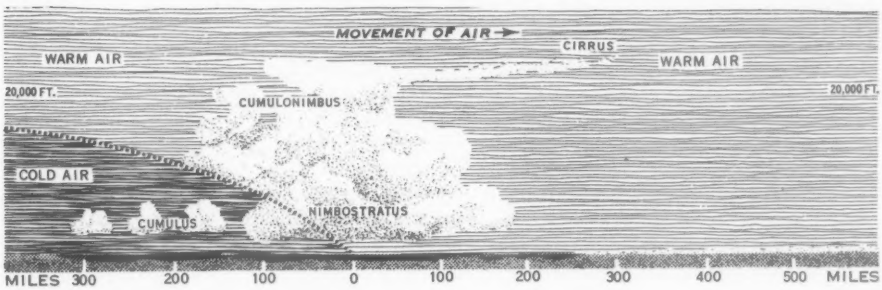
Meteorologists classify fronts according to their relative temperature, their location with respect to the surface, and other factors, but pilots can be mainly concerned with just two broad categories—cold and warm.

A cold front is the leading edge of cold air which is displacing warmer air ahead of it.

The term "cold" is only relative and implies no specific numerical temperature values. The temperatures in a cold air mass may range from the 70's in summer to well below zero in winter. Cold air masses moving southward from northerly latitudes are caught by prevailing westerly winds and pushed eastward. Thus, a cold front in the United States most often moves from northwest to southeast.

A cold front may extend for hundreds of miles along the boundary of an air mass, making an "end run" impractical. For the pilot planning to cross a front, the cirrus cloud tops of frontal cumulonimbus or thunderstorms serve as route markers. These cirrus clouds travel in the direction of frontal movement. Noting their direction, the pilot can determine how to cross the front as quickly as possible and can make proper allowance for winds while on instruments.

Faced with a cold front, the VFR pilot's best weapon is patience; the cold air mass usually moves rapidly and is normally followed by cooler and drier (thus clearer) air; Below—diagram of a typical cold front. Regardless of temperatures, a front is called "cold" when cooler air overtakes and replaces warm air. Heavier cold layer wedges under the warm air, forcing it aloft.



The average width or distance across a cold front—measured in a straight line perpendicular to its leading edge—is approximately 50 miles. This figure varies with the speed of movement of the front and with the terrain. In the United States, cold fronts travel at an average speed of 25 to 30 miles per hour. Slow movement and rough terrain tend to broaden the zone of frontal weather.

The zone of weather in a cold front is usually not as extensive as that associated with a warm front. Though some of the most violent weather changes occur with fast-moving cold fronts, the weather at a fixed point on the ground tends to improve more rapidly after the passage of a cold front than after a warm front. In flight, the duration of turbulence, icing, or "in-the-soup" operation is shorter than with warm fronts.

On the ground, the passage of a typical cold front might begin with increasingly southerly winds in the warm air lying ahead of the front. High, dense cirrus clouds then appear on the horizon in the direction from which the front is approaching, and the barometric pressure decreases. Next, the clouds thicken and lower and rain begins, increasing in intensity as the front comes closer. The wind shifts to a westerly or northerly direction as the front passes and the pressure rises sharply. A cold front normally is followed by cooler and drier weather.

This sequence of events is typical, but not universal. Nearly every imaginable type of weather—except a hurricane—may occur with a cold front. In some cases, an almost continuous line of thunderstorms may form parallel to and some distance ahead of the cold front. This line, referred to as a "squall line", is often characterized by a wall of turbulent clouds building up to 40,000 feet or higher. The individual cells sometimes reach heights of 60,000 or 70,000 feet. Squall lines produce some of the most violent weather known.

In the air, the appearance on the horizon of a long line of altocumulus or middle-layer clouds is often the first indication of a cold front. There may be cumulonimbus or thunderstorm clouds apparently growing up through, and towering above, the altocumulus and possibly some cirrus above all the other clouds. *This is the proper time for the pilot to consider changing his flight plan.*

Under or Over?

The strictly VFR pilot must keep out of all clouds. If he plans to stay beneath the clouds, he must determine this is possible from the standpoint of ceiling, visibility, turbulence, and terrain by checking all available weather information, pilot reports and forecasts for stations along his flight path.

If he plans to go across on top, the pilot must consider the limitations of his plane. The clouds may build faster and higher than the aircraft can climb. For any sustained flight above 10,000 feet, he should have oxygen. At higher altitudes, winds may be half or even more than half the cruising speed of his aircraft, making fuel a very critical consideration.

Every pilot should develop his personal set of rules for flying cold fronts. The following rules can serve as a guide:

- If the front is moving toward you, wait on the ground for it to pass through. Normally better weather will follow in a few hours.
- If you are forced to penetrate a frontal zone, fly through it in the most direct route possible, regardless of your destination.
- Check the airplane frequently for icing, especially in clouds.
- Reduce airspeed in heavy turbulence.
- Anticipate strong downdrafts in heavy showers. ■

Next month—Warm Fronts

Famous
Flyers

Tony Fokker

The Flying Dutchman

The first self-made millionaire in aviation was Anthony Fokker, a Dutchman, not a German as many still believe, since aircraft bearing his name and Luftwaffe markings terrorized the Western Front in the First World War. Despite the fact that Fokker subsequently became an American citizen and came close to dominating the aircraft manufacturing industry in this country, and perhaps the world, his name for most people, today, still evokes only memories of a brief, romantic era when gentlemen in silk scarves engaged each other in mortal aerial combat.

Fokker was the "l'enfant terrible" of plane builders, an unschooled boy genius who at age 23 almost single-handedly gave the German army control of the skies in 1914-15 (after the Allied Powers had scorned him). He was a great, self-taught pilot who, alone among major manufacturers, test flew all of his aircraft. His aircraft were the first to reach the Pole and the first to circumnavigate the globe.

The story of his life, undoubtedly one of the most curious Odysseys in aviation history, began in 1890 in Blitar, Java, then known as the Dutch West Indies, where Anthony Herman Gerard Fokker was born. Tony's father was an extremely prosperous coffee planter who, when his son reached school age, decided to retire and return home to Haarlem in Holland so that the boy could receive a proper education.

Papa Fokker might have spared himself the trouble of moving, for young Tony, used to the free idyllic life on the semi-Paradisical plantation, could never accept the discipline of Dutch schooling. He was bright, imaginative, good with his hands, and forever inventing mechanical devices, but he never bothered to finish high school.

In 1910 Tony beguiled his father into sending him to an automotive institute at Zalbach in Germany which just happened to have an aviation school where students could learn to fly. Actually the school had no aircraft whatsoever: instruction consisted of taking part in building an airplane out of scrap parts and a worn automobile engine. When Herr Buechner, the "flying instructor" (who had never flown anything) cracked up the first two student creations, the school folded.

The undaunted Tony scraped up funds from his father and friends and proceeded to build an airplane of his own design, based on a theory he had developed from observing the flight of bits of cardboard and paper airfoils thrown out of his attic window. The first Fokker original had an open fuselage of tube steel and was powered by a 50 hp Argus engine. The undercarriage consisted of wheels and bamboo skids under the wing. Braced by a network of wire cables to a center post (hence the name *Spin*, meaning "spider"), the wing and tail surfaces had a sharp dihedral rise, giving the airplane a leaflike ability to flutter in the wind without capsizing.

Originally there was no rudder, no ailerons, no means of lateral control whatever! Steering was to be accomplished by altering the angle of incidence of the wings—a system that might have worked aloft, but which gave the pilot no directional control on the ground, as the young inventor discovered after his first taxiing mishap. A rudder was added.

Beginning with short straight hops, Fokker taught himself to fly in his homemade airplane and soon qualified for the coveted pilot's license. In an era when most aircraft were inherently unstable, his designs resulted in a basic stability that made flying a joy.

With a few modifications to his airplane, Fokker was soon able to loop the loop (he was the first man in Germany to do so) and earn the applause of thousands as a touring stuntflyer. It gave him immense satisfaction to be invited to perform before an assembled crowd of 10,000 at his home town of Haarlem, under the proud eye of his father.

Tony profited by this occasion to secure the backing of his father to launch himself as an aircraft manufacturer at age 20. Exhibitions and competitive flying were fine, but building airplanes was the real challenge. With the clouds of World War I gathering on the horizon, Fokker realized that the airplane could play a deciding part in military operations, and he set out to convince foreign governments to buy his airplane.

In late 1913, the German army arranged for Fokker to set up a flying school and construct planes at Schwerin, about 220 miles north of Berlin. When the war broke out, he had a working force of 150 employees, turning out both military and sport airplanes. Immediately he was swamped by orders for military aircraft. Within a few months he was financially solvent for the first time in his life, and even beginning to pay back creditors. More than 7,600 Fokker planes were built during the war, including the famous Tri-plane in which Baron von Richthofen finally met his death at the hands of Captain Roy Brown, in a Sopwith *Camel*.

After the Armistice Fokker found himself in a precarious state in Germany. In an astonishing cloak-and-dagger operation he arranged to have the major part of his aircraft construction equipment smuggled, in trucks and trains, across the border. In six weeks he was able to move enough of his equipment to set up business in Holland.

He opened plants at Veere and at Amsterdam, and within a few years Fokker Aircraft became Holland's third largest industry. He continued to manufacture military aircraft and some amphibians, but his major effort now was directed at producing passenger planes for the new era of commercial aviation which he felt was about to begin. In 1920 he introduced his extremely successful F-2 passenger plane, an enclosed cabin monoplane with a cantilevered wing. Capable of speeds over 90 mph, the F-2 was the prototype for numerous European air carrier aircraft.

General Billy Mitchell encouraged Fokker to begin construction in America, and in 1924 he established a plant at Teterboro, New Jersey. It was originally called the Atlantic Aircraft Company, but was later changed to Fokker Aircraft Corporation of America. Within the span of five years Tony became one of America's leading aircraft manufacturers. He purchased a home in Nyack, New York, and eventually became an American citizen. Edsel Ford was so enthused with the new Tri-motor that Fokker developed that he encouraged Richard Byrd to buy it for his North Pole expedition, and in 1926 Byrd and Floyd Bennett made the first flight over the Pole.

By this time business was booming for Fokker's American operation. He opened a second plant in West Virginia, and by 1928 he had nearly 1,000 employees working for him. He eventually took the lead in American passenger aircraft production, and by the end of the decade 40% of all the transport aircraft used by United States airliners were Fokkers. These transport airplanes were all variations of his basic trimotor cabin monoplane; the largest one carried 32 passengers. In addition to introducing steel tubing and cantilevered wings to America, he also pioneered better streamlining techniques and passenger comfort.

Although in Europe Tony Fokker had always operated as a "lone wolf" manufacturer, in America he decided to sell large blocks of stock to budding airlines who were his best customers. He was negotiating a sale of a major interest in his output to General Motors when the Great Depression of the 1930s put an end temporarily to business expansion.

For the next eight years the "Flying Dutchman" traveled between his home in New York, his factory in Holland, and his villa in St. Moritz, spending more and more time at the Swiss villa, doing little work. His Dutch plant continued to prosper, however, and he was the largest producer of passenger airplanes for the various European airlines during the 1930's. As World War II loomed he again began to turn out military aircraft, and a twin-engine Fokker fighter was the highlight of the 1936 Paris Aircraft Exposition. In 1939 he was developing a four-engine airliner in hopes of recapturing the commercial market, when he entered a hospital in New York for a minor operation. Three weeks later he was dead of a post-operative infection.

"I have never cared about making money for its own sake," he said once. "My satisfaction lies in the way I do a thing, and in the fact that I have done it against odds." ■

Self-taught pilot Fokker was photographed in October, 1912, at the Johannistal flying field near Hamburg, Germany, as he was about to take a passenger aloft in his flimsy creation.

Pilot BRIEFS

■ ANTICOLLISION STROBES and electrical systems from different manufacturers may look the same, but intermixing can create a problem. Although the wire cable and plugs connecting the light assembly to the power supply may appear identical, the color-coded pin connections may differ. If they are not properly connected, a power supply failure could result. Personnel making such installation should pay close attention to the manufacturer's wiring and schematic drawings to assure themselves that the proper wire is attached to the proper connector. As an added precaution the use of a continuity meter is recommended to determine that the proper connections are made. Airplane owners and mechanics take note.

■ AIRPORT ENGINEERING SERVICES. Guidelines for the selection, review and approval of engineering services used under the Airport Development Aid Program (ADAP) are contained in a new FAA Advisory Circular. Designed for sponsors of airport construction seeking FAA matching grants, the circular is available without charge from the DOT/FAA Distribution Unit, TAD 484.3, Washington, D.C. 20591. Request AC No. 150/5100-9.

■ SUPERSONIC BOOMS BANNED. Civil aircraft are prohibited from exceeding the speed of sound (Mach I) when flying over the land mass or territorial waters of the United States by a Federal Aviation Regulation effective April 27, 1973. Exceptions to the rule may be authorized by the Administration in designated test areas after review of an environmental impact analysis. Complete text of this amendment to Part 91 of the FARs was published in the Federal Register of March 28.

■ AIRWORTHINESS CERTIFICATES. A new FAA Advisory Circular, AC 21-12, gives step by step procedures for acquiring the certificate. Especially helpful for homebuilders and owners of military surplus aircraft or modified aircraft. Available from DOT/FAA Distribution Unit.

■ WEATHER CORRECTIONS. Through a typographical error in an earlier article ("Coming in Under a Cloud", February 1973), a "broken" sky was incorrectly defined as one with clouds covering .5 to .9 of the sky. The correct figures are .6 to .9 of the sky. The term "ceiling" was also inadvertently substituted for "cloud layers." While two or more cloud layers may exist at any given point over the earth, in aviation terms there is only one ceiling--namely the lowest layer of "broken" or "overcast" clouds or obscuration not classified as thin or partial. Also noted: the symbol "S", indicating a special weather report, has been replaced by "SP". The latest issue of Pilot's Handbook of Aeronautical Knowledge, AC-61-23A, 1971, still uses "S" in its examples.

Coast-to-Coast Powder Puff Derby Attracts 130

The 27th All-Woman Transcontinental Air Race (AWTAR), better known as the Powder Puff Derby, will take off on July 16 from Palomar Airport at Carlsbad, Calif. Deadline for crossing the finish line at Chemung County Airport, Elmira-Corning, N.Y. is 6 p.m. July 16. The 2,543 mile course has scheduled stops at Prescott, Ariz.; Albuquerque; Liberal, Kan.; Topeka; Waterloo, Iowa; Champaign, Ill.; Flint, Mich.; and Niagara Falls.

Some 130 planes are expected to compete for trophies and $12,575 in cash prizes. Pilots may fly solo or with copilots in stock-model single- or twin-engine aircraft from 145 hp to 450 hp. Winners are determined by speed, with scores representing the difference between the "par speed" (handicap) for each type of aircraft and the average groundspeed over the course.

DOT Annual Report Lists Accomplishments in Aviation

The Sixth Annual Report (Fiscal Year 1972) of the Department of Transportation has been published. The report covers the 1972 accomplishments of the Department in all areas of transportation including railways, highways, the U.S. Coast Guard and pipelines as well as air travel. The aviation sections cover air safety, increased IFR activity, hijack rules, the general aviation accident prevention program and other subjects. Also included are FAA statistics on aircraft activity, accidents, employment, etc.

The 226 page book is available from Government Printing Office Bookstores for $1.50, or may be ordered by mail from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, for $1.85. (Stock #5000-00062).

Parts 3, 4 of Airman's Information Manual Reorganized

FAA has avoided a substantial increase in the subscription price of Part 3 of the Airman's Information Manual "Operational Data and Notices to Airmen", by rescheduling publication from a four week to an eight week cycle. Also, some chapters have been eliminated and others have been transferred to Part 4 of AIM. Chapters to be discontinued are: SID and STAR listings; Sectional Chart Bulletin; Substitute Route Structure; Oil Burner Routes; Changes to Part 4. Chapters to be transferred to Part 4 are those on Preferred Routes and Metroplex. Annual subscription price for Part 3 will now be $22.00 (instead of the originally scheduled $44.00).

Part 4, "Graphic Notices and Supplemental Data", formerly published twice a year, will now appear quarterly. The annual subscription price is $9.50. Subscriptions to AIM are handled by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Planning Conference Scheduled

"Partners in Progress" is the theme of FAA's Fifth Annual National Aviation System Planning Review Conference, scheduled for the Washington Hilton Hotel in Washington, D.C. May 21-23. The conference will survey the decade ahead in aviation. Topics of discussion are Community Concern and the Public Benefit; Plans and Policy; Navigation/Landing Systems; Systems Performance Assurance; Air Traffic Control; and Airports. Attendees may register at the door.

Demand for Aircraft Mechanics, Avionics Technicians to Increase

During the next four years the demand for avionics technicians is expected to nearly triple, especially in the general aviation field, according to a survey by the Alabama Institute of Aviation Technology, which predicted that the need for aircraft maintenance mechanics will increase by some 56 percent during that same time.

The Alabama survey, based on responses from airlines, air taxi operators, and Alabama fixed base operators, indicates that the greatest need will be by fixed base operators. The unusually high demand for avionics technicians will be due at least in part to regulatory changes that will bring about the increased use of more sophisticated equipment in all types of planes.

FAA Clinic Attracts 50,000th CFI

A significant milestone in flight instructor progress was noted recently when Charles F. Westmoreland of Yorktown, Va., became the 50,000th participant to complete an FAA Flight Instructor Refresher course. These courses are held frequently at various locations across the country and are designed to keep the flight instructors abreast of the latest aviation information and training techniques.

A special certificate signed by FAA Administrator Alexander P. Butterfield was presented to Westmoreland by C. R. "Tex" Melugin, Jr., Deputy Director of FAA Flight Standards at a ceremony at the conclusion of the course at Richmond, Va. on April 26.

FAA Alert List

The following aircraft were listed at press time with the FAA Office of Air Transportation Security as stolen or missing:

Beech 35	N2967V
Beech 60	N176D
Cessna 150	N22487
Cessna 150	N51109
Cessna 150	N8080F
Cessna 172	N3011U
Cessna 182	N5706B
Cessna 206	N71977
Cessna 210	N2283R
Cessna 210	N3884Y
Cessna 210	N5775J
Cessna 310	N8009M
Piper PA-28	N6542J
Piper PA-28	N8529N
Piper PA-32	N8919N

If you see any of these aircraft advise the nearest FAA flight service station at once. If your aircraft is stolen, notify the local police and FSS.

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. No anonymous letters will be used, but names will be withheld on request.

• That Glider in the Attic

I certainly enjoyed "Airplane in the Attic" in your November 1972 issue. The material was fact-filled and very well presented. My imagination was especially fired by the glider photo on page two. Can you tell me anything abount the craft?

Ron Schwiesow
Boulder, Col.

The craft in the photo is a home-built hang-glider—a lightweight non-powered aircraft in which the "pilot" hangs by his armpits from the framework and is either towed aloft or launches himself into the wind from a hilltop. This particular photo was taken at an Experimental Aircraft Association East Coast Fly-in at Frederick, Md., in the fall of 1971.

• Look Out for Linearity

The article "Reading Between the Lines" (Dec. 1972) makes some good points for the conscientious pilot to remember about interpolating tables of values. However, I feel one point is possibly misleading. Your example on page 8 uses a table that is based on a non-linear function of temperature, pressure altitude and gross weight. Takeoff distance is not directly dependent on temperature change in a one-to-one ratio, as implied by your calculations. From 0° to 25°, a change of 184 feet is indicated; but from 25° to 50°, 198 additional feet are needed; and 212 feet between 50° and 75°.

One should use caution with tabular interpolation and determine if linearity (identical value changes for equal intervals) exists; and, if not, make sure that the safety factor is in the pilot's favor—as it happens to be in your example.

Todd Fisher
Tuscaloosa, Ala.

Normally the safety margin will be broad enough to nullify lack of linearity, but unquestionably it is safer to be certain.

• About the "Blue Seal"

One of the high points of my month is when the "NEWS" arrives; I consider it my primary source of aviation news.

In your February issue you told of the new Part 61 (FAR) requirements for obtaining a private pilot certificate, but you made no reference to the "Blue Seal" which required five hours of instrument training. I was surprised to see it omitted, since my own instrument training is a great source of confidence to me (should I ever be unwise enough to venture into IFR conditions). Can you clarify?

Donald H. Carter
Methuen, Mass.

Although you will not find the term "Blue Seal" in the new regulations, the requirement for instrument training for a private certificate is included in revised Part 61.107(a)6 as a basic competency requirement (rather than as specified hours of training). When instrument instruction was added to the requirements for a private certificate more than a decade ago, the "Blue Seal" was used as part of a broad campaign to encourage veteran pilots to upgrade their old-style tickets by obtaining minimum IFR training.

• Crossing the Borders

In a November 1972 article on crossing international borders you mentioned a booklet put out by the Customs people called "Customs Guide for Private Flyers", available for 25 cents from the Government Printing Office. I sent for this book, using the stock number you gave (4802-0029) but they sent back my money and advised they could not supply the publication. Can you explain this?

George Prough
Los Angeles, Calif.

The Bureau of Customs advises that the booklet in question is now being revised and this is apparently the reason they were unable to fill your order. We will inform readers when it is back in stock.

• Busy signals

When I call center, FSS or tower and get no response I begin to wonder whether they received me or not. Usually I figure the controller is busy on another frequency, but how is the pilot to know for sure? It seems to me that a lot of unnecessary calling (and anxiety over an inoperative transmitter) could be saved if the pilot could be given a signal (chime, note, buzzer, clicks) that the controller was on another line and would respond as soon as possible.

Chester L. Roberts, M.D.
Glendale, Calif.

To understand why this is not always practical, you must fully visualize the controller's work situation. Supposing that he is busy talking to Pilot A when Pilot B calls in. If the controller responds to Pilot B with a "click", indicating that he had been received and will be called back as soon as possible, the controller would have to note down B's "N" number—otherwise he would have no means of identifying him on response. Furthermore, if calls come in from Pilots C and D, etc., while the controller is still talking to A, he would have to stop to note down their "N" numbers as well, in order to call them back eventually. This would add to the controller's workload and actually slow down the service to pilots.

Finally, consider what would happen if two or three pilots call in more or less at the same time, while the controller is busy. If he simply responds with a "click", (instead of acknowledging a call number) all three would assume that they had been received, whereas in fact one or two of them may have been blocked out.

In sum, having a busy controller use a mechanical sound to acknowledge a reception from a pilot would create more problems than it would cure. The controller or FSS specialist must evaluate each call on the basis of its urgency and his knowledge of the traffic picture, and respond accordingly. Pilots can help by monitoring the frequency before calling in on it—if it is already in use, another transmission is obviously going to slow things down for all concerned. Incidentally, if a pilot calls in on an open frequency while the specialist is busy transmitting on another, the specialist may transmit simultaneously on both frequencies, as a means of indicating to the second caller that he has been heard and please stand by.

• Preserving the Alert List

I suggest that your Alert List (of stolen aircraft) could do a better job if it were located some place in the magazine where it could be removed and kept handy for ready reference, without destroying the magazine.

The Alert List is a fine idea. We maintain a careful lookout here, as I'm sure others do, for lost aircraft. Sooner or later one will touch down here, and hopefully it will be spotted and nailed. But we have to destruct FAA AVIATION NEWS in order to post the list, and we don't like to do that. Knowing the difficulties that abound in the layout of any fine magazine, I wouldn't presume to tell you how to solve the problem.

John L. Howard
Wellington, Kansas

About the only solution would be to print the Alert List on the Forum page, where removing it would not affect printed matter.

• Plugged Pitot Problems

I can't resist adding my two cents to the question raised by your November 1972 article, "Preflight in Haste . . .", about plugged pitot tubes. The reply (in Flight Forum, February 1973) by Paul Eriksen is correct: this is not an unusual problem, in fact it is not always a preflight problem. I have seen moisture get inside and freeze in the tube underneath the instrument panel and elsewhere. This can happen with or without a pitot tube cover, and you can't see it or probe for it.

In 500 hours of flying time I have had the problem in one way or another three times; the first was on my second solo. Fortunately my instructor taught me to fly by the "attitude" of the airplane and not to depend entirely on instruments. I flew around for about 15 minutes, practiced a few stalls, and landed without incident. My point is, better learn to fly the airplane without the airspeed indicator, as some day you may have to.

Dean G. Hotaling
Albany, New York

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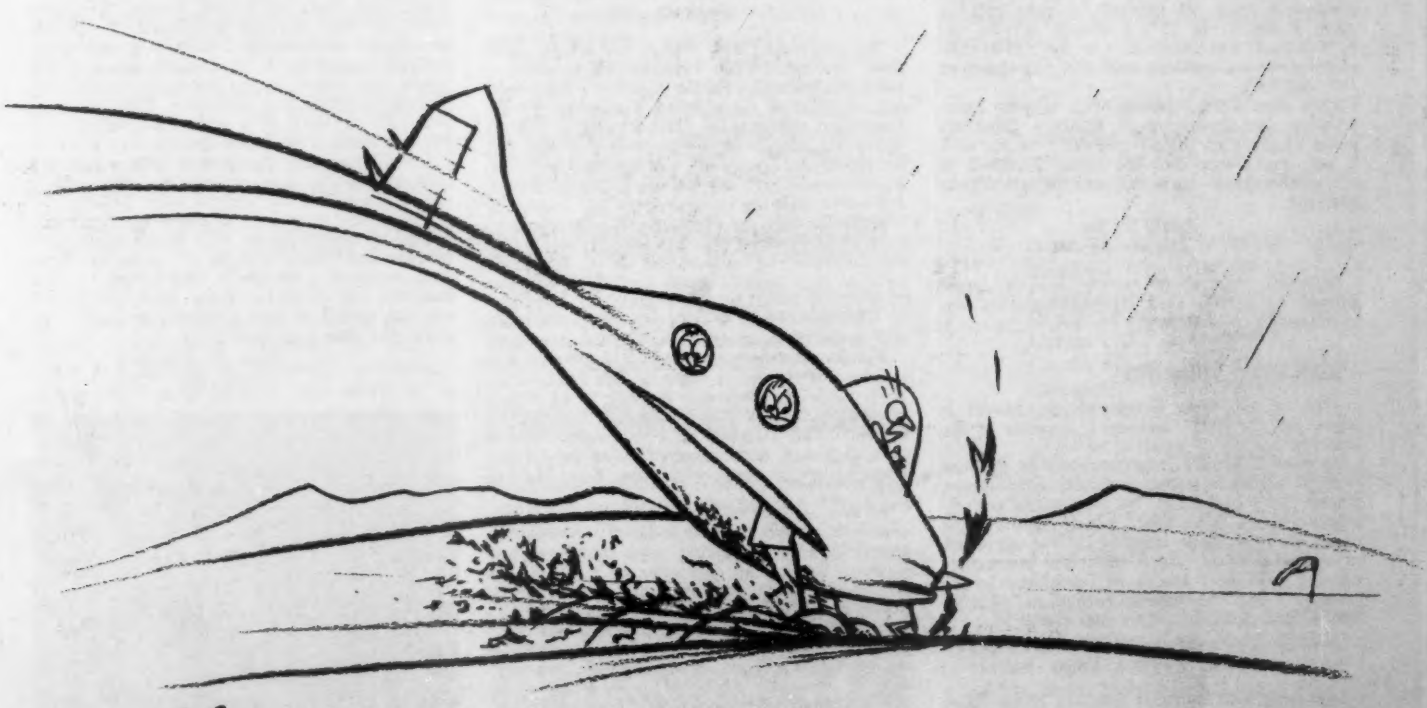

Osborn

. . . after a rain

Suggested by Thomas E. Campbell
Hanksville Airway Facilities, Utah